LETTERS TO THE EDITOR

TO THE EDITOR:

Criteria for Identification of Brucella Species

In 1953, we noted[1] the difficulty encountered when speciation within the genus Brucella is attempted by means of only three or four criteria—these commonly being sensitivity to thionine and fuchsin, requirement for CO_2, and production of H_2S. At that time we reported that 12 per cent of 235 strains of brucellae in our stock culture collection were received under species designations which were incompatible with their biologic characteristics. Similar observations obtain for the 110 strains added to our collection during the intervening years.

Correct designation of species within this genus is important for better understanding the ecology of these organisms, the epidemiology of human brucellosis, and the efficacy of prophylactic and therapeutic measures. We are not concerned here with those occasional aberrant strains (fewer than 2 per cent in our collection) for which the serologic data counter their other characteristics, and which therefore represent a distinct taxonomic problem.[2] Rather, we iterate that a much more commonly encountered problem is the strain which gives "atypical" reactions in thionine, fuchsin, or sulfide tests, but which can readily be identified by means of additional tests. We suggest the following instance is illustrative of this.

Through the courtesy of Dr. Borts we recently received nine cultures of brucella which were recovered from an outbreak of brucellosis in Iowa.[3] As shown in the tabulation, all nine of these cultures, received as Br. melitensis, appear to be Br. suis; though the negative sulfide and fuchsin tests are suggestive of the former, all other characteristics are those of the latter species.

	Brucella:			
	abortus	melitensis	suis	9 Iowa Strains
Sensitivity tests				
Thionine[4,*]	+	−	−	−
Fuchsin[4]	−	−	+	−
Crystal violet[4]	−	−	+	+
Pyronin[4]	−	−	+	+
Azure A[1]	+	−	+	+
Safranine[1]	−	−	+	+
Nitrite[5]	−	+	−	−
Carbamate[1]	−	+	−	−
H_2S[1]	+	−	+	−
Urea[1]	−	−	+	+
Fermentation tests[6,7]				
Glucose	+	+	+	+
Inositol	+	−	−	−
Maltose	−	−	+	+
Rhamnose	+	−	−	−
Trehalose	−	−	+	+
Serology[1,†]				
Abortus serum	+	−	+	+
Melitensis serum	−	+	−	−
Brucellaphage tests				
Stock undiluted phage‡	+	−	+	+
RTD of above	+	−	−	−

* Details of procedures are given in the references cited.

† Three of the nine Iowa strains were acriflavine-positive and therefore were omitted from serologic and phage tests.

‡ "Russian Brucellaphage, type abortus, strain 3" obtained through the courtesy of Dr. R. W. I. Kessel.

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REFERENCES

1. Pickett, M. J.; Nelson, E. L.; and Liberman, J. D. Speciation Within the Genus Brucella. II. Evaluation of Differential Dye, Biochemical, and Serological Tests. J. Bact. 66:210–219, 1953.

2. Meyer, M. E., and Morgan, W. J. B. Metabolic Characterization of Brucella Strains that Show Conflicting Identity by Biochemical and Serological Methods. Bull. World Health Organ. 26:823–827, 1962.
3. Hendricks, S. L.; Borts, I. H.; Heeren, R. H.; Hausler, W. J.; and Held, J. R. Brucellosis Outbreak in an Iowa Packing House. A.J.P.H. 52:1166–1178, 1962.
4. Pickett, M. J.; Nelson, E. L.; Hoyt, R. E.; and Eisenstein, B. E. Speciation Within the Genus Brucella. I. Dye Sensitivity of Smooth Brucellae. J. Lab. & Clin. Med. 40:200–205, 1952.
5. Pickett, M. J., and Nelson, E. L. Speciation Within the Genus Brucella. III. Nitrate Reduction and Nitrite Toxicity Tests. J. Bact. 68:63–66, 1954.
6. ————. Speciation Within the Genus Brucella. IV. Fermentation of Carbohydrates. Ibid. 69:333–336, 1955.
7. Pickett, M. J. Fermentation Tests for Identification of Brucellae. Am. J. M. Technol. 21:166–170, 1955.

TO THE EDITOR:

The Public Health Laboratory of the Future

It is apparent that the artificial division of public health areas and their laboratories into city, county, and state facilities creates wastage and duplication. The East and West Coasts of the United States are composed of giant metropolitan areas which blend into one another. These areas have common transportation systems and common health practices, and all of them contain individuals shifting and migrating unceasingly.

For these reasons, and because the family unit of today tends to be a small mobile unit which depends for help not so much upon neighbors as upon organizations, it is an archaism to have public health areas created on any basis other than regional. These regions should be delimited in practical terms, with the defining feature being the ability of electronic hardware to handle the obligated responsibility.

Obviously, there will continue to be an organic structure containing personnel and machines; however, it is the added concept of the holistic function of this unit which would be radically different from that which currently exists.

The initial input into such a unit would be the recording of the birth of an individual. This would, in effect, "open an account" for each new person and would tag him for health and health-related purposes. To this central data storage unit would come all pertinent health-related data, such as growth and development, illnesses, occupational exposures, accidents, mental health problems, social welfare problems, chronic diseases, and rehabilitation information. This means that on any individual there would be "total information."

This central unit could deliver on demand, epidemiologic prediction, economic prediction, demographic analysis, and health surveys. It would be able to provide public officials with needed community data for school and hospital construction, for recreational data, and for public health staffing and education purposes.

In order to accomplish this, one will need not only an educated public but public health officials whose approach has been changed from the local and static to the regional and predictive. There are many sections of the proposed program already developed along theoretical lines and several actually functioning in certain areas of this country.

There is, for example, a mathematical model suitable for computer use in epidemiologic prediction. Nutrition surveys have already been created whereby an individual's diet is entered on a data card and the material forwarded for electronic storage. This provides not only statistical data on caloric consumption of selected individuals, but also information on the presence or absence of trends toward nutritional inadequacy. A derivative, not immediately apparent, of such a survey would be to help in the development of certain agricultural products to fulfill previously unknown and unmet needs.

Electronic methods for the reading or recording of the electrocardiogram, pho-